AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A nitrogen-free ozone generator system, comprising:

a first electrode;

a second electrode which is opposite to the first electrode and forms a discharge region having a gap;

raw material gas supply means for supplying ~~an~~ oxygen ~~gas~~ as a raw material gas; and

a catalytic material which is provided on a dielectric or ~~the~~ an electrode in the discharge region and contains a photocatalytic material with a band gap energy of 2.0 eV to 2.9 eV, wherein, when an AC voltage is applied between the first electrode and the second electrode from a power supply to ~~inject~~ produce a discharge ~~electric power into~~ in the discharge region, and the oxygen ~~gas~~ is supplied from the raw material gas supply means to the discharge region, then discharge light having ~~at least~~ a ~~light~~ wavelength in a range of 428 nm to 620 nm ~~is irradiated to~~ irradiates the catalytic material ~~by~~ from the discharge, the catalytic material is excited to dissociate the oxygen ~~gas~~ passing through the discharge region into oxygen atoms, ~~a~~ gas pressure of the discharge region through which the oxygen ~~gas~~ passes is kept at 0.1 MPa to 0.4 MPa, and the oxygen ~~gas~~ and the ~~dissociated~~ oxygen ~~atom~~ atoms are subjected to a bonding process to generate ~~an~~ ozone ~~gas~~.

2. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to claim 1, wherein ~~purity of~~ the oxygen ~~gas is~~ has a purity of at least 99.99% ~~or higher~~.

3. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to claim 1, wherein ~~a~~ the gap ~~interval~~ of the discharge region ~~having the gap~~ is no larger than 0.6 mm ~~or less~~.

4. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to claim 1, wherein the oxygen contains a noble gas, as an auxiliary gas ~~is contained in the oxygen gas at~~, in a concentration of 500 ppm to 50000 ppm with respect to the oxygen ~~gas~~, ~~and an~~ accelerating ozone generation ~~reaction is accelerated~~.

5. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to claim 1, wherein the catalytic material is applied to a wall surface of the dielectric or the electrode in the discharge region, and a contact surface area between the catalytic material and the discharge light is 1.5 times as large as ~~an~~ area of the dielectric or the electrode.

6. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to claim 1, wherein the catalytic material is a powder of the photocatalytic material having a particle diameter of 0.1 μm to 50 μm and adhered to a wall surface of the dielectric or the electrode in the discharge region to increase ~~a~~ surface area.

7. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to claim 1, wherein ~~a roughness of 1 μm to 50 μm is formed on~~ a wall surface of the dielectric or the electrode in the discharge region has a roughness of 1 μm to 50 μm, and the catalytic material is provided on the wall surface ~~on which the roughness is formed, and a~~ so that surface area of the catalytic material is increased.

8. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to claim 1, wherein the dielectric in the discharge region is a dielectric through which the discharge light passes, and the catalytic material is ~~the~~ a photocatalytic material powder of 1% to 10% in volume ratio contained in the dielectric through which the discharge light passes.

9. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to claim 1, wherein the dielectric in the discharge region is a dielectric through which the discharge light passes, the photocatalytic material is provided on the electrode in the discharge region, and the photocatalytic material on a discharge region side is covered with the dielectric through which the discharge light passes.

10. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to claim 1, wherein the photocatalytic material includes at least one material selected from the group consisting of Cu_2O, In_2O_3, Fe_2TiO_3, Fe_2O_3, Cr_2O_3, PbO, V_2O_5, $FeTiO_3$, WO_3, and Bi_2O_3.

11. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to claim 1, wherein the photocatalytic material includes at least one ~~of materials made of~~ rare-earth metal ion ~~complexes~~ selected from the group consisting of $Nb_{2m}P_4O_{6m+4}$, $W_{2m}P_4O_{6m+4}$, $Ta_{2m}P_4O_{6m+4}$, $In_{2m}P_4O_{4m+4}$, $BaTi_4O_9$, $MnTi_6O_{13}$, $TiO_aN_bF_c$, $SrTiO_aN_bF_c$, $BaTiO_aN_bF_c$, and ~~plural elements~~ combinations thereof.

12. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to claim 1, wherein the photocatalytic material is doped with a material, as an auxiliary catalyst, selected from the group consisting of Ru, Ni, Pt, RuO2, NiOX ~~or~~, and NiO.

13. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to claim 4, wherein the catalytic material is applied to a wall surface of the dielectric or the electrode in the discharge region, and a contact surface area between the catalytic material and the discharge light is 1.5 times as large as ~~an~~ area of the dielectric or the electrode.

14. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to claim 4, wherein the catalytic material is a powder of the photocatalytic material having a particle diameter of 0.1 μm to 50 μm and adhered to a wall surface of the dielectric or the electrode in the discharge region to increase ~~a~~ surface area.

15. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to claim 4, wherein ~~a roughness of 1 μm to 50 μm is formed on~~ a wall surface of the dielectric or the electrode in the discharge region has a roughness of 1 μm to 50 μm, and the catalytic material is provided on the wall surface ~~on which the roughness is formed, and a~~ so that surface area of the catalytic material is increased.

16. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to claim 4, wherein the dielectric in the discharge region is a dielectric through which the discharge light passes, and the catalytic material is a photocatalytic material powder of 1% to 10% in volume ratio contained in the dielectric through which the discharge light passes.

17. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to claim 4, wherein the dielectric in the discharge region is a dielectric through which the discharge light passes, the photocatalytic material is provided on the electrode in the discharge region, and the photocatalytic material on a discharge region side is covered with the dielectric through which the discharge light passes.

18. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to claim 4, wherein the photocatalytic material includes at least one material selected from the group consisting of Cu_2O, In_2O_3, Fe_2TiO_3, Fe_2O_3, Cr_2O_3, PbO, V_2O_5, $FeTiO_3$, WO_3, and Bi_2O_3.

19. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to claim 4, wherein the photocatalytic material includes at least one ~~of materials made of~~ rare-earth metal ion ~~complexes~~ complex selected from the group consisting of $Nb_{2m}P_4O_{6m+4}$, $W_{2m}P_4O_{6m+4}$, $Ta_{2m}P_4O_{6m+4}$, $In_{2m}P_4O_{4m+4}$, $BaTi_4O_9$, $MnTi_6O_{13}$, $TiO_aN_bF_c$, $SrTiO_aN_bF_c$, $BaTiO_aN_bF_c$, and ~~plural elements~~ mixtures thereof.

20. ~~A~~ The nitrogen-free ozone generator system according to claim 4, wherein the photocatalytic material, is doped with a material as an auxiliary catalyst, selected from the group consisting of Ru, Ni, Pt, RuO2, NiOX ~~or~~, and NiO.

21. (Currently Amended) A nitrogen suppression ozone generator system, comprising:

a first electrode;

a second electrode which is opposite to the first electrode and forms a discharge region having a gap;

raw material gas supply means for supplying ~~an~~ oxygen ~~gas~~ as a raw material gas;

nitrogen gas supply means for supplying ~~a~~ nitrogen ~~gas~~; and

a catalytic material which is provided on a dielectric or ~~the~~ an electrode in the discharge region and contains a photocatalytic material with a band gap energy of 2.0 eV to 3.6 eV, wherein, when an AC voltage is applied between the first electrode and the second electrode from a power supply to ~~inject~~ produce a discharge ~~electric power into~~ in the discharge region, and the oxygen ~~gas~~ is supplied from the raw material gas supply means to the discharge region, the nitrogen ~~gas~~, in a range of 10 ppm to 500 ppm, is supplied for acceleration of an ozone generation reaction to the oxygen ~~gas~~ from the nitrogen gas supply means, then discharge light having ~~at least~~ a ~~light~~ wavelength in a range of 344 nm to 620 nm ~~is irradiated to~~ irradiates the catalytic material ~~by~~ from the discharge, the catalytic material is excited to dissociate the oxygen ~~gas~~ passing through the discharge region into oxygen atoms, ~~a~~ gas pressure of the discharge region through which the oxygen ~~gas~~ passes is kept at 0.1 MPa to 0.4 MPa, and the oxygen ~~gas~~ and the ~~dissociated~~ oxygen ~~atom~~ atoms are subjected to a bonding process to generate ~~an~~ ozone ~~gas~~.

22. (Currently Amended) ~~A~~ The nitrogen suppression ozone generator system according to claim 21, wherein the oxygen contains a noble gas, as an auxiliary gas ~~is contained in the oxygen gas at~~, in a concentration of 500 ppm to 50000 ppm with respect to the oxygen ~~gas~~, ~~and an~~ accelerating ozone generation ~~reaction is accelerated~~.

23. (Currently Amended) ~~A~~ The nitrogen suppression ozone generator system according to claim 21, wherein the catalytic material is applied to a wall surface of the dielectric or the electrode in the discharge region, and a contact surface area between the catalytic material and the discharge light is 1.5 times as large as ~~an~~ area of the dielectric or the electrode.

24. (Currently Amended) ~~A~~ The nitrogen suppression ozone generator system according to claim 21, wherein the catalytic material is a powder of the photocatalytic material having a particle diameter of 0.1 μm to 50 μm and adhered to a wall surface of the dielectric or the electrode in the discharge region to increase ~~a~~ surface area.

25. (Currently Amended) ~~A~~ The nitrogen suppression ozone generator system according to claim 21, wherein ~~a roughness of 1 μm to 50 μm is formed on~~ a wall surface of the dielectric or the electrode in the discharge region has a roughness of 1 μm to 50 μm, and the catalytic material is provided on the wall surface ~~on which the roughness is formed~~, ~~and a~~ so that surface area of the catalytic material is increased.

26. (Currently Amended) ~~A~~ The nitrogen suppression ozone generator system according to claim 21, wherein the dielectric in the discharge region is a dielectric through which the discharge light passes, and the catalytic material is a photocatalytic material powder of 1% to 10% in volume ratio contained in the dielectric through which the discharge light passes.

27. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to ~~any one of claims~~ claim 1 ~~to 20~~, used for a chemical vapor deposition apparatus or an ALD (atomic layer deposition) thin film deposition apparatus.

28. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to ~~any one of claims~~ claim 1 ~~to 20~~, used for a chemical vapor deposition apparatus or an ALD (atomic layer deposition) thin film deposition apparatus for producing any one of a nonvolatile memory ferroelectric thin film, a high dielectric constant dielectric thin film, a nitride metal thin film, an oxide metal, an optical material thin film, a high density photomagnetic recording thin film, a superconducting thin film, and a high quality capacitor thin film.

29. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to ~~any one of claims~~ claim 1 ~~to 20~~, used for an ozone condensing apparatus.

30. (Currently Amended) ~~A~~ The nitrogen-free ozone generator system according to ~~any one of claims~~ claim 1 ~~to 20~~, used for a pulp bleaching apparatus.

31. (Currently Amended) A nitrogen-free ozone generating method ~~provided with~~ employing a first electrode, a second electrode which is opposite to the first electrode and forms a discharge region ~~having a gap~~, ~~raw material gas supply means for supplying an oxygen gas as a raw material gas, and a catalytic material which is provided on a dielectric or the electrode in the discharge region and contains~~ containing a photocatalytic material with a band gap energy of 2.0 eV to 2.9 eV, ~~wherein~~ the method comprising:

applying an AC voltage ~~is applied~~ between the first electrode and the second electrode ~~from a power supply~~ to ~~inject~~ produce a discharge ~~electric power into~~ in the discharge region,

~~the~~ supplying oxygen ~~gas is supplied from the raw material gas supply means~~ to the discharge region, thereby producing discharge light having ~~at least~~ a ~~light~~ wavelength in a range of 428 nm to 620 nm ~~is irradiated to~~ and irradiating the catalytic material ~~by~~ from the discharge,

exciting the catalytic material ~~is excited~~ to dissociate the oxygen ~~gas~~ passing through the discharge region into oxygen atoms, and

~~a~~ maintaining gas pressure of the discharge region ~~through which the oxygen gas passes is kept~~ at 0.1 MPa to 0.4 MPa, ~~and~~ so that the oxygen ~~gas~~ and the ~~dissociated~~ oxygen a~~tom are subjected to a bonding process~~ atoms bond to generate ~~an~~ ozone ~~gas~~.

32. (Currently Amended) A nitrogen suppression ozone generating method~~, provided with~~ employing a first electrode, a second electrode which is opposite to the first electrode and forms a discharge region ~~having a gap, raw material gas supply means for supplying an oxygen gas as a raw material gas, nitrogen gas supply means for supplying a nitrogen gas~~, and a catalytic material ~~which is provided on a dielectric or the electrode in the discharge region and contains~~ containing a photocatalytic material with a band gap energy of 2.0 eV to 3.6 eV, ~~wherein~~ the method comprising:

applying an AC voltage ~~is applied~~ between the first electrode and the second electrode ~~from a power supply~~ to ~~inject~~ produce a discharge ~~electric power into~~ in the discharge region,

~~the~~ supplying oxygen gas ~~is supplied from the raw material gas supply means~~ to the discharge region,

~~the~~ supplying nitrogen gas in a concentration range of 10 ppm to 500 ppm ~~is supplied~~ to the oxygen for acceleration of ~~an~~ ozone generation ~~reaction to the oxygen gas from the nitrogen gas supply means~~, thereby producing discharge light having ~~at least~~ a light wavelength in a range of 344 nm to 620 nm ~~is irradiated to~~ and irradiating the catalytic material ~~by~~ from the discharge,

exciting the catalytic material ~~is excited~~ to dissociate the oxygen ~~gas~~ passing through the discharge region ~~into oxygen atoms~~,

~~a~~ maintaining gas pressure of the discharge region ~~through which the oxygen gas passes is kept~~ at 0.1 MPa to 0.4 MPa, ~~and~~ so the oxygen ~~gas~~ and the ~~dissociated~~ oxygen ~~atom are subjected to a bonding process~~ atoms bond to generate ~~an~~ ozone ~~gas~~.